FIR/R171

FAO Fisheries Report, No. 171 FIR/R171 (En)

LIBRARY
MAR 2 9 1976
FISH & WILDLIFE SERVICE

Report of the eighth session

ADVISORY COMMITTEE ON MARINE RESOURCES RESEARCH

Sesimbra, Portugal, 8-12 September 1975

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

DOCUMENTS OF THE FISHERY RESOURCES DIVISION OF FAO DEPARTMENT OF FISHERIES

Documents which are not official FAO publications are issued in several series. They are given a restricted distribution and this fact should be indicated if they are cited. Most of them are prepared as working papers for meetings, or are summaries of information for use of Member Governments, organizations, and specialists concerned. These series are the following:

FAO Fisheries Report **FIR/R (No.)**
FAO Rapports sur les pêches
FAO Informes de pesca

Special groups of synopses are identified by symbols followed by classification numbers based on indexed code of "ASFA":

SAST Data concerning certain species and fish stocks
MAST Information on methods and subjects
OT Oceanographic data
IT Limnological data

and

FAO Fisheries Technical Papers **FIR /T (No.)**
Documents techniques FAO sur les pêches
Documentos técnicos de la FAO sobre la pesca

Special groups of Technical Papers are identified by:

RE Indexed list of experts and institutions drawn from registers maintained by the Fishery Resources Division

IN Provisional editions of inventories and lists of fishery data stored and maintained by the FAO Fishery Data Centre

CB Lists of periodicals, special sections of "Aquatic Sciences and Fisheries Abstracts (ASFA)", special bibliographies and papers concerning documentation problems

MFS Provisional editions of "FAO Manuals in Fisheries Science"

WAFR Provisional reviews of fisheries resources and their level of exploitation, by regions or by species groups, whithin the World Appraisal of Fishery Resources system

Some documents also have another identification, if, for example, they have been contributed to a meeting for which papers have been numbered according to another system.

DOCUMENTS DE LA DIVISION DES RESSOURCES HALIEUTIQUES DU DÉPARTEMENT DES PÊCHES DE LA FAO

Des documents qui ne figurent pas parmi les publications officielles de la FAO sont publiés dans diverses séries. Ils font seulement l'objet d'une distribution restreinte, aussi convient-il de le préciser lorsque ces documents sont cités. Il s'agit le plus souvent de documents de travail préparés pour des réunions, ou de résumés d'information à l'intention des gouvernements des pays membres, ainsi que des organisations et spécialistes intéressés. Ces séries sont les suivantes:

FAO Fisheries Circular **FIR/C (No.)**
FAO, Circulaire des pêches
Circular de Pesca de la FAO

Des catégories spéciales de synopsis sont identifiées à l'aide de symboles suivis des chiffres de classification basés sur le code d'indexation de la «ASFA»:

SAST Données sur certaines espèces et populations de poissons
MAST Renseignements sur des méthodes et des sujets
OT Données océanographiques
IT Données limnologiques

et

Des catégories spéciales de documents techniques sont identifiées à l'aide des symboles suivants:

RE Listes indexées d'experts et institutions tirées des registres tenus à jour par la Division des ressources halieutiques

IN Editions provisoires des listes et inventaires concernant les données sur les pêches accumulées et mises à jour par le Centre de données halieutiques de la FAO

CB Listes de périodiques, des sections spéciales de la «Aquatic Sciences and Fisheries Abstracts (ASFA)», des bibliographies particulières et des articles sur les problèmes de documentation

MFS Editions provisoires des «Manuels FAO de science halieutique»

WAFR Synthèses provisoires des ressources halieutiques et leur niveau d'exploitation, préparées, par régions ou groupes d'espèces, dans le cadre du Programme mondial pour l'évaluation des ressources halieutiques

Certains documents portent parfois d'autres numéros d'identification, par exemple s'ils ont été préparés pour une réunion dont les documents ont été marqués à l'aide d'un autre système.

DOCUMENTOS DE LA DIRECCION DE RECURSOS PESQUEROS DEL DEPARTAMENTO DE PESCA DE LA FAO

Esta Dirección publica varias series de documentos que no pueden considerarse como publicaciones oficiales de la FAO. Todos ellos tienen distribución limitada, circunstancia que debe indicarse en el caso de ser citados. La mayoría de los títulos que figuran en dichas series son documentos de trabajo preparados para reuniones o resúmenes de información destinados a los estados miembros, organizaciones y especialistas interesados. Estas series son las siguientes:

FAO Fisheries Synopsis **FIR/S (No.)**
Synopsis FAO sur les pêches
Sinopsis FAO sobre la pesca

Grupos especiales de sinopsis se distinguen con las siglas siguientes, seguidas por números de clasificación que se basan en las claves de los índices de la «ASFA»:

SAST Datos relativos a ciertas especies y poblaciones
MAST Sinopsis sobre métodos y materias
OT Sinopsis sobre oceanografía
IT Sinopsis sobre limnología

y

Grupos especiales de documentos técnicos se identifican por las siglas siguientes:

RE Listas índices de expertos y de instituciones tomadas de los registros que se llevan en la Dirección de Recursos Pesqueros

IN Ediciones provisionales de los inventarios y listas de datos de pesca acumulados y guardados por el Centro de Datos Pesqueros de la FAO

CB Listas de periódicos, secciones especiales de la «Aquatic Sciences and Fisheries Abstracts (ASFA)», bibliografías especiales y trabajos relativos a los problemas de documentación

MFS Ediciones provisionales de los «Manuales de la FAO de Ciencias Pesqueras»

WAFR Reseñas provisionales de los recursos pesqueros y de su estado actual de explotación, por regiones o por grupos de especies, en el marco del sistema mundial para la evaluación de los recursos pesqueros

Algunos documentos tienen también otra identificación si, por ejemplo, son contribuciones a una reunión cuyos documentos han sido marcados con arreglo a otros sistemas.

REPORT OF THE EIGHTH SESSION

OF THE ADVISORY COMMITTEE ON MARINE RESOURCES RESEARCH

Sesimbra, Portugal, 8–12 September 1975

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, November 1975

PREPARATION OF THIS REPORT

This is the Report of the Eighth Session of the Advisory Committee on Marine Resources Research, as edited and approved by the Officers of the Committee. The Working Papers for the Session (with exceptions as indicated in Appendix 3) will be issued as a Supplement to this Report.

Distribution:

FAO Department of Fisheries
FAO Regional Fisheries Officers
ACMRR
Selector SM
Member Countries
UN Organizations members of ICSPRO
IOC
IABO
UNEP
Members of ACMRR Working Parties

Bibliographic entry:

Eighth Session of the Advisory Committee on Marine Resources Research. Sesimbra, Portugal, 8–12 September 1975 (1975)
FAO Fish. Rep., (171):20 p.
Report of the .....

Conference report - FAO activities, IOC activities. Fisheries science - research capabilities. Stock assessment. Resource management. Multispecies fisheries. Sea laws.

CONTENTS

		Page
I.	GENERAL REPORT	1
1.	PROCEDURAL MATTERS	1
	Opening of the Session	1
	Adoption of the Agenda	1
2.	EVALUATION OF THE IMPACT OF EXPECTED CHANGES IN THE REGIME OF THE SEA ON RESEARCH AND MANAGEMENT ASPECTS OF FISHERIES	1
	Assessment of present state of fishery science, particularly in developing regions	2
	Short-term and long-term needs, and measures to respond to them	3
	Policy implications for the conduct of fishery related research	5
	Criteria and objectives of fishery management	6
3.	MULTIPLE USE OF OCEAN SPACE AND RESOURCES AND ITS IMPACT ON FISHERIES	7
4.	SOME ACTUAL PROBLEMS IN THE MANAGEMENT OF ADVANCED FISHERIES	8
5.	WORKING PARTIES	10
	Joint ACMRR/CARPAS Working Party on Scientific Evaluation of the State of the Stocks in the Southwest Atlantic	10
	Working Party on Scientific Advice to Fisheries Management and Development Bodies	10
	Working Party on Aquaculture	10
	Working Party on Fishing Effort and the Monitoring of Fish Stock Abundance	10
	Working Party on Marine Mammals	10
	Working Party on Biological Effects of Pollutants	11
	Working Party on Biological Accumulators	11
	Working Party on Ecological Indices of Stress to Fisheries	11
	Ad hoc Group of Experts on the Facilitation of Acoustic Research in Fisheries	11
	SCOR Working Group on Biological Data Inventories	11
	SCOR Working Group 36 on Coastal Upwelling Processes	11
	Liaison Panel on Marine Research Related to Pollution	11
	SCOR Working Group 46 on River Inputs to Ocean Systems	11
	SCOR Working Group 50 on Biological Effects of Ocean Variability	11

		Page
6.	OTHER MATTERS	11
	Relationships of ACMRR with IOC, SCOR and other bodies	11
	Joint Oceanographic Assembly	12
	World Appraisal of Fishery Resources	12
	Aquatic Sciences and Fisheries Information System (ASFIS)	12
	Working papers for ACMRR sessions	13
	Intersessional activities	13
	Date and place of next session	13
	Election of Officers	13
II.	APPENDIXES	
	APPENDIX 1 - LIST OF PARTICIPANTS	15
	APPENDIX 2 - AGENDA	18
	APPENDIX 3 - LIST OF DOCUMENTS	19
	APPENDIX 4 - LIST OF ACRONYMS USED IN REPORT	20

I. GENERAL REPORT

1. PROCEDURAL MATTERS

Opening of the Session

1. The Chairman, Mr. G. Saetersdal, opened the Session, and welcomed the members of the Committee and observers. The list of those attending is given in Appendix 1. He noted that the present session was the first one to be held outside FAO Headquarters, and hoped that the atmosphere of a small fishing port, and the excellent facilities provided would lead to a fruitful discussion. On behalf of the Director-General of FAO, Dr. H. Kasahara, Director of the Fishery Resources and Environment Division, welcomed the participants.

Adoption of the Agenda

2. The Agenda, as given in Appendix 2, was adopted. The Chairman noted that the work of the Committee would be concentrated on two substantive items - research activities after the conclusion of the U.N. Conference on the Law of the Sea, and specific problems in resource assessment and management.

2. EVALUATION OF THE IMPACT OF EXPECTED CHANGES IN THE REGIME OF THE SEA ON RESEARCH AND MANAGEMENT ASPECTS OF FISHERIES

3. The Committee recognized that changes which result from UNCLOS or through continued unilateral and multilateral actions will result in major shifts in jurisdiction over ocean space and hence in the authority(ies) responsible for the management and allocation of marine fisheries resources. Perhaps as much as 95 percent of the world's current ocean harvest will fall within economic zones of coastal states should jurisdiction be extended to 200 nautical miles, which appears highly likely. The character and responsible entity for managing resources occurring in areas beyond coastal state control is not yet clear, but it is obvious that management entities will have overlapping responsibilities inasmuch as many stocks will be common to several jurisdictional zones (international as well as national).

4. Expected jurisdictional changes may in part set the legal framework for resolution of problems concerned with resources allocation but many of the fundamental problems of the collection of adequate biological, economic and statistical data and the analyses and effective communication of technical information to resources managers will remain. In general, many coastal states will be confronted with increased authority and responsibilities for managing fisheries resources which occur partially, totally or seasonally within their economic zones. Although these responsibilities may not represent an insurmountable task in many countries, in others there will be urgent need to develop the necessary scientific and management competence. In the short run this may result in a substantial increase in the demand on FAO's Department of Fisheries in terms of providing service guidance and technical expertise to developing countries, either individually, or through regional arrangements.

5. The Committee examined the impact of changes in the legal regime of the sea under four headings:

(a) The present state of fisheries science, particularly in developing states.

(b) The short and long term needs and measures required to respond to anticipated changes.

(c) Implications for the conduct of fishery and related research.

(d) Criteria and objectives of fishery management.

Assessment of present state of fishery science, particularly in developing regions

6. Regardless of the exact jurisdiction which may characterize the proposed UNCLOS economic zones it is obvious that coastal states will assume growing responsibilities for the study and management of fish resources. This shift makes the assessment of scientific means and resources available at national, regional and international levels essential, particularly for those countries who do not have a long tradition in such fields. The Committee discussed the preliminary assessments presented in Working Papers 13 and 16 which examine the marine science skills for different countries and regions in terms of fisheries production, GNP, overall level of development, etc.

7. The Committee noted the difficulties in establishing indices which would adequately represent the scientific capabilities of a given country or region. It emphasized, for example, that qualitative elements - e.g., capabilities of scientists and their distribution in research institutions; communications with governments, industries and universities; scientific exchange and mutual assistance at regional level - may be as important as the quantifiable parameters (numbers of scientists, of research vessels, of publications, total expenditures, etc.). The difficulty of measuring these various qualities in a comparable way between countries or groups of countries (since definitions regarding scientific fields, level of experience, etc., vary from country to country) and hence of interpreting the relative scientific competence and resources was also noted.

8. Despite these limitations, the Committee was of the opinion that such a census is essential in

(i) identifying the scientific skill currently available to meet changing management responsibilities in the various world fishing areas; and

(ii) evaluating the adequacy and nature of research expenditures, and comparing these with similar figures for agricultural and industrial sectors.

9. The limited data already compiled show that there are large differences in the relative and absolute values of the resources devoted by individual countries. They also suggest that a few developing countries devote a similar proportion of their national or fishing incomes to that expended by developed countries, though there may be less similarity if research expenditure is expressed relative to the fish resources potentially accessible to each country. Changes in jurisdiction may result in an increase within many developing countries in the already serious disparity between the responsibility of resources management and the technical capabilities.

10. The Committee agreed that an analysis of the present state of fishery science covering the whole world would be useful and indeed would be required as the new law of the sea regime becomes established. The study should in the first place compile information on each country's population and economic situation, their efforts in higher education and science, in general, and relative to the use of ocean resources in particular. An evaluation should also be made of the approximate magnitude of the fishery resources accessible to each country. In the second place, an evaluation is needed of each country's present effort in fishery science and related activities (for example, oceanography, marine surveying, weather services, etc.), including measures of budget, institutions, personnel at various levels of training, facilities, etc. The study should also present information on the actual and desired amount of expenditure for research and development in comparable industries, thus providing some measure of the adequacy of support for scientific activities related to the management of marine fisheries.

11. Finally, the study should include an analysis of the world fish catch, and its value by stocks, and review how the benefits from the fisheries on these stocks are divided between countries. A comparison of these benefits with national research expenditures and capabilities would give some indication of the areas where further strengthening of fishery scientific activities would be desirable.

12. The difficulties in carrying out such a study were recognized. These include the problems of defining fishery science, of normalizing costs and benefits from country to country, and of assembling the necessary data from the many countries concerned. Nevertheless, it was felt that these difficulties were not insuperable and that useful estimates could be made using techniques of the relevant social sciences. The study might best be pursued under contract in an academic institution with access to expertise in fishery and marine science, economics and other political and social sciences, and would be facilitated by contact and cooperation with the programme of Training, Education and Mutual Assistance of IOC.

Short-term and long-term needs, and measures to respond to them

13. Inasmuch as individual coastal states are assuming greater responsibilities for the wise use of the living resources and the growing world demand for food will put additional pressure on these resources, it will become more important that the right decisions are taken concerning their utilization and management. This includes the need to increase catches when this is possible (within the constraints set by the various long-term objectives) and to apply restrictive management measures when these are needed. The Committee noted that in the world as a whole these problems were increasing in both intensity and complexity at a faster rate than the growth of scientific capacity to deal with them.

14. The great majority of coastal states do not at present have the capacity within national institutions covering the range of relevant technical and scientific fields to provide adequate advice on the decisions to be taken. The Committee therefore examined the short-term problem of ensuring the best advice (particularly but not exclusively scientific advice) to the national decision-making process, and the long-term problem of building up the national capabilities for managing their living marine resources. It was, however, recognized that some countries, because of their general shortage of trained scientists, or the relative low priority that can be given nationally to fishing problems will not, in the foreseeable future, be able to build up their competence in all fields, and that international and mutual assistance will continue to be needed.

15. The Committee noted that the immediate and pressing needs have been discussed in other bodies and that its composition and terms of reference put it in a particularly favourable position to look at the longer term problems, which accordingly were discussed in greater detail. Particular emphasis was given to the building up of research capacity.

16. One important aspect of this is the establishment of effective national research institutions. It was recognized that not all countries would be immediately concerned with the large-scale multi-disciplinary fishery research institutions such as those at Seattle, Bergen or Lima. National institutions of whatever size, however, can benefit from close links, on the one hand with the national decision-making machinery, and on the other hand, with other research institutes with similar interests in the same country (for example, having the fishery research institute on or adjacent to a university campus can be very helpful), and with fishery research institutes in other countries. An important and effective mechanism is the establishment of close regional links, such as those provided by ICES, whereby individual scientists from various countries have regular opportunities to discuss their work with scientists working on similar problems in other countries. If the fishery scientists in a region effectively operate as a closely-linked group, they can together achieve the "critical mass" necessary to maintain the impetus of research, which could not be reached by individual national fishery institutes working on their own.

17. Special attention was given to the concept of sister institutes, whereby close links are established between experienced and less experienced institutions (usually, but not necessarily, in developed and developing countries respectively). This arrangement can have great advantages in such matters of interchange of staff, especially when the range of scientific problems facing the two national fisheries are reasonably similar. However, this system cannot solve all the problems of the transfer of scientific capability. The arrangements are most effective if maintained over a reasonably long period, and there is adequate

funding for costs of travel, etc. Though the appropriate national bilateral aid agencies would seem suitable sources of such funding, they are often unwilling to undertake the necessary long-term commitment and the relatively inconspicuous form of aid involved. It was agreed that the attention of bilateral agencies should be drawn to the effectiveness in suitable circumstances of sister-institution arrangements, and to the long-term benefits that could accrue from supporting these arrangements.

18. Other difficulties include the risk of too great dependence of the recipient institute on the special approaches and techniques practised in the donor institute, and the limited number of potential experienced sisters. Both of these might be tackled by multiple arrangements, i.e., each less experienced institute being linked to a number of "sisters" - preferably in different regions (including in its own area) and with different specialities, and each advanced institute being linked to several less advanced ones, though in this case it might be best for these to be all in the same region. FAO was urged to examine systematically the possibilities of extended "sister" arrangements and to identify potential sister institutions and their areas of specialization.

19. A special form of such links may be useful when the recipient institution is not large. Then in some fields it may confine itself to identifying certain programmes, e.g., carrying out a specific survey, and have these executed largely by the sister institute.

20. The Committee discussed at some length the problems of training; there seemed to be no simple way of guaranteeing the production of good research scientists, or of training how to do research. However, knowledge of certain scientific techniques was a necessary (but not sufficient) condition for good fishery research. Techniques such as acoustic survey methodology, the analysis of catch and effort data using established models, etc., can be taught, as can the corresponding techniques of general resource management, taking account of, for example, standard economic methods.

21. The Committee noted that FAO has had a long established programme of training and dissemination of information on these techniques, through training courses, publication of manuals, etc. Short-term training centres in such subjects as stock assessment, basic fisheries biology, acoustic surveys, etc. - usually lasting some four to six weeks - had proved a very successful training method in relation to the costs involved. However, the funding of them (which had recently been supported mainly by bilateral agencies), had become increasingly difficult. This situation was regretted, and the Committee believed it to be important that such training courses should be strongly supported. There was also discussion of larger and more permanent regional arrangements, including training centres which could provide longer-term training, as well as undertaking some research functions. It was agreed that the possible role of such centres deserved more careful examination.

22. The Committee noted that a lot of training was done through various forms of fellowships, whereby scientists from developing countries spent time varying from a few weeks to one or two years, in an institute, usually in a developed country. These could be useful when given in the form of training in a specific research technique, closely related to the duties and experience of the fellow, e.g., in age-determination by otolith reading (usually requiring a relatively short period) or, over a longer period, in learning the basic principles of carrying out research by taking an integral part in a carefully chosen research programme. However, in many instances, fellowship programmes, particularly in the form of generalized tours of fishery institutes, teach the visitor little, and can waste a lot of time of the host institution. Therefore fellowship programmes need careful choice and coordination, taking into account the demands on and capacities of the host institution for giving instruction, and the needs of the fellows. FAO should seek to promote a careful study, perhaps by an appropriate institution, of the performance of fellowships, with a view to identifying the most effective types of fellowship programme.

23. It was also noted that training was currently not readily available in a number of important fields, particularly in the multi-disciplinary aspects of fishery management. Decision-makers in fishery administration in particular need to have training to evaluate and make the best use of the scientific advice offered to them.

Policy implications for the conduct of fishery related research

24. The Committee noted that the United Nations Conference on the Law of the Sea was likely to result in changes in the patterns of national jurisdiction which will greatly increase coastal state control over all kinds of marine research in the waters adjacent to their coasts. Since the waters likely to be affected produce more than 95 percent of the present world catch of marine living resources, the changes in control could obviously affect the nature, volume or timeliness of fishery research, and the management based on the results of such research.

25. The Committee therefore believed that it was highly desirable, with the aim of ensuring the best management of the resources, that research within the regions of coastal state control should be facilitated. In formulating the nature of coastal state control over research there have been proposals to distinguish between resource-related and other marine research. ACMRR recognized the difficulties in making this distinction.

26. The need for facilitating research within the zones of coastal state control is greatest in respect of stocks that move either between the zones of two or more coastal states, or from one zone beyond the limits of national control.

27. Facilitation of research could be improved in a number of ways. Good confidence between all those concerned is most desirable, and this could be increased by joint participation by scientists of the countries concerned in the full range of research activities, i.e., from formulation of research programmes to data processing and interpretation. Especially in respect of stocks common to several countries, regional organizations can be most helpful in coordinating the planning and carrying out of research and possibly also as a channel through which national consent could be requested or granted.

28. Regional arrangements are in fact nearly always essential at all stages leading up to taking management decisions. Although it is desirable that the decisions and their implementation should be decentralized to a local level to the extent that this is sensible in relation to the stocks, the movements of fish make purely local arrangements ineffective, especially as fishing activities increase.

29. The management policy for a heavily exploited stock must be decided for the whole stock over all its range. Indeed, to the extent that the increasing general intensity of fishing is making the interactions between stocks more important, management of a stock in one area may have to take account of fish of another stock that migrate through that area, and are caught elsewhere. Management is therefore seldom a purely national affair, but requires regional cooperation involving two or more countries depending on the extent of the movement of the stocks of interest.

30. Regional discussions are particularly valuable in producing scientific analyses of the state of the stocks, and assessments of the probable effects of alternative management measures. The long-term value of close association between scientists in a region has already been noted in respect of the establishment of the "critical mass" of scientific talent and the stimulation achieved by the interchange of ideas between scientists working in the same field. The immediate benefits can be at least as great, by enabling a group of scientists to pool their skills, and thus deal with problems which cannot be readily tackled by any single national institution in the region acting on its own. The Committee therefore recommended the strengthening of regional bodies, and in this respect noted the specific aspects that need support:

(a) good scientific competence on the secretariat of bodies in developing regions, at least in the short run, to help provide guidance and leadership to the regional scientific work;

(b) funds for the greater participation of national scientists in regional activities, including travel to meetings of working groups, as well as of the parent body itself, and

(c) the provision of certain central services, e.g., in data processing.

Criteria and objectives of fishery management

31. UNCLOS has, when discussing fishery matters, given most attention to the manner in which jurisdiction over, and access to, resources are divided between states. To the extent that UNCLOS clarifies this issue, and establishes or confirms rights over resources or over the use of them, so we may expect renewed attention to be paid to the problems of managing them rationally. Some general objectives of management have been laid down in numerous regional and specialized fishery instruments, as well as in the 1958 Convention on Fishery Resources of the High Seas wherein "conservation" is defined and some criteria for its application are set out.

32. Since these documents were drafted there have been changes in the concepts of fishery management. These have resulted from a number of factors including improved knowledge and concern for marine ecosystems; recent shifts in emphasis between biological, economic and social factors; and the increased diversity and intensity of resource exploitation. It is important that any legal document arising from UNCLOS or other negotiations should be consistent with these changing objectives of management, and with present understanding of the nature of the resources. This is not true of many of the existing draft UNCLOS texts.

33. For example, it was noted that in Article 50 of the single negotiating text prepared by the Chairman of Committee II it is proposed that "the coastal state shall determine the allowable catch of the living resources in its EEZ". This could lead to over-exploitation of resources moving between two or more EEZ's unless the countries concerned ensure that the sum of the allowable catches in each zone is not more than the total allowable catch for the resource as a whole. The division of this total will have to take account of the size of each zone, the area of specific habitat within it, and the direction, rate and periodicity of interchange (mixing) between the zones.

34. The Committee considered the possibility of suggesting alternative wording but decided that, if only because of the time schedule, this would be unlikely to achieve the desired ends. It appeared more useful to prepare a review, from the scientific aspect, of the goals of fishery management, which could be used in interpreting and applying whatever formulation eventually emerges from UNCLOS. It was decided, therefore, to establish a small working party to report to the next session, with the following terms of reference:

> "Critically examine the general concepts relating to the goals and objectives of managing living resources as well as the scientific and technical basis for achieving stated goals. In carrying out its task the working party should:
>
> (i) identify the range of proposed goals;
>
> (ii) their purpose(s); and
>
> (iii) interpret them insofar as they depend on scientific advice."

35. Attention should be paid to the single negotiating text prepared by the Chairman of UNCLOS Committee II, with particular reference to the extent to which the articles are likely to facilitate or impede any or all of these objectives. In making its study the working party should take account of inter alia the analysis and recommendations found in the American Fisheries Society Proceedings on Optimum Sustainable Yield as a Concept in Fisheries Management, the report of the ACMRR Working Party on Scientific Advice to Management Bodies, and the Airlie Workshop, and the relevant papers in the Proceedings of the FAO Conference on Fisheries Development and Management (J.Fish.Res.Bd.Can., Vol.30, No.12 (2)).

36. The form of the advice given to decision-makers by the scientific and other technical groups can be very important in reaching the right decisions. The scientists should understand what is the range of objectives in managing the fisheries concerned (increasing gross catch, conservation of stocks, maintaining employment, etc.), and the range of management techniques (e.g., vessel licensing, closed seasons, etc.) which could be introduced. The effects of each management programme can thus be evaluated in terms of its specific impact on the chosen objectives, as well as its general effect on the stocks of fish, etc. While it probably should not, in principle, be the responsibility of the scientist to specify the objectives, or the types of management measures, in practice the present lack of clarity about objectives and measures make it highly desirable that scientists clearly communicate their views of the consequences of different actions (including a failure to take any action), and of proposed management measures. This points to the need for wider dissemination of ideas on management objectives and strategies, e.g., through seminars, publications, etc., as well as for clearer identification of the problems and concepts, e.g., by a mixed task force of scientists, administrators and others.

3. MULTIPLE USE OF OCEAN SPACE AND RESOURCES AND ITS IMPACT ON FISHERIES

37. The Committee reviewed the working paper "The effect of increasing multiple use of ocean space and resources on world fishery productivity and extraction" which had been prepared by R.P. McGreevy of the University of Washington's Institute for Marine Studies, with support from the FAO Department of Fisheries and the U.S. National Marine Fisheries Service. It was recognized that this initial draft was well conceived and contained a wealth of information on a very broad range of topics. It was clear that the impact of the various activities on fisheries was certain to increase and that such a document would provide necessary information on this increasing impact to decision-makers and other concerned public officials.

38. A number of organizations had information on one or another of the maritime activities discussed in the paper, and it was initially proposed that the report should be circulated for review to such organizations. However, this process could be unduly time-consuming, and it seemed more practicable to have the paper reviewed by ACMRR members and other individuals they or the secretariat might propose. It was desirable for the accuracy of the data to be checked and the reasonableness of the analysis and interpretation in Section 3 to be evaluated. The reviews should be sent to the author for use in revising the paper. He should be requested to prepare a summary of his conclusions for attachment to the present report, which should be brought to the attention of COFI. The revised paper should be published in his name, preferably by the Institute for Marine Studies.

39. The more general question was then discussed; what research programmes are desirable to elucidate conflict areas, and especially to prevent damage to fisheries? The main potential conflict areas appear to be shipping, recreation, marine mining, oil and gas production, waste disposal, and land reclamation. Of these activities, FAO had given principal attention to waste disposal and to the broader problems of marine pollution, largely with the financial support of UNEP. In connection with all these activities, some research is directed toward demonstrating that living resources are affected, other research to mitigating harmful effects as the activities continue. There is also research related to establishment of effective monitoring effects on living resources.

40. Action by FAO and ACMRR is required in part to identify research problems that have been neglected, for example, the socio-economic, legal and political aspects of multiple use conflicts. More importantly, ACMRR and FAO can improve coordination of such research and the dissemination of its results, and can provide guidance in establishing research objectives and programmes in developing countries.

41. Publication of the paper should encourage more detailed studies of multiple use conflicts in specific areas such as the Mediterranean and Caribbean Seas. It was agreed that some of the laboratories represented on ACMRR might join forces to prepare for the next ACMRR meeting a comprehensive report on the impact of offshore oil and gas production

on fisheries. The Chairman should take necessary steps to request working papers to be prepared along these lines for the next session of ACMRR.

4. SOME ACTUAL PROBLEMS IN THE MANAGEMENT OF ADVANCED FISHERIES

42. The Committee took note of the increased problems which were occurring as fishing intensified and was exerted on a growing number of the components of the ecosystem. The problems of optimizing yields from species complexes and/or reducing the incidental take of unwanted species was considered.

43. The Committee considered the management and assessment problems associated with various kinds of multi-species fishery situations occurring in different parts of the world. It recognized that multi-species fisheries occur in their most extreme form in tropical areas where the exploited resources comprise large numbers of species, mostly small and having similar biological characteristics, living in close association, and caught together throughout each fishing area. In such fisheries, owing to the large number of species and their close association, management action on an individual species basis is mostly impracticable. Instead, for most of them their scientific assessment and management must be approached on a total fish biomass basis (or perhaps the biomass of the most important species) using data on total fish catch and fishing effort, and an appropriate assessment model. If the time frame is right, this procedure may take account of the complex biological interactions between the species within the multi-species population. Provided catch data for individual species, or groups of species, are available, adjustments can be made to allow for differences in their monetary value should the management objectives be in economic terms.

44. The Committee noted that although assessment based on this approach has been made, apparently with success in some tropical fisheries, it cannot guarantee against the severe depletion of some species in the exploited population. Observations in tropical areas indicate that large changes have occurred in the relative abundance of many species and depletion of some may have occurred. Little is yet known about the long-term effects of such changes and the capacity of severely depleted species to recover when subjected to reduced exploitation, but changes observed in the East China Sea fishery following the wartime reduction in fishing indicated a rapid increase in abundance of severely depleted species. This suggests a relatively high degree of resilience of the individual components within such ecosystems. One reason may be the difference in the rates of exploitation of parts of the total population of a species throughout its area of distribution.

45. The Committee stressed the need for more detailed studies of the structures of such multi-species populations, their movements and rates of mixing between different parts of their total area of distribution.

46. Because of the close association in such multi-species populations management measures aimed at controlling age of fish capture (e.g., mesh size) are for the most part impracticable. Management of such fisheries must therefore be effected by measures controlling the exploitation rate of the total fish biomass, either by catch quotas or by the direct regulation of fishing effort (including restrictions on the kinds and sizes of fishing gears and fishing methods).

47. Although less complex in terms of the number of species exploited by each unit fishery than those in the tropics, major multi-species fisheries, posing basically similar management and associated assessment problems take place in temperate fishing regions, notably in the North Atlantic and North Pacific. In these regions the post-war expansion of fishing activities has resulted not only in more intensive exploitation of the stocks of certain species of long standing economic importance but also in the development of new fisheries on species not previously fished, many of which are important components of the prey of the traditionally fished species.

48. We therefore need to broaden our understanding of the dynamics of whole ecosystems, and not merely of selected species. Appropriate methods of doing this, to permit construction of predictive models, must now be developed. The inadequacy of present understanding of ecological processes has important consequencies also for management. Uncertainties in predictions of responses of the resources to changes in exploitation and to management measures must be taken into account in formulating and applying those measures. The existence of significant interactions, and of natural trends - as well as fluctuations - in resources productivity, and the fact that the ecosystems are not necessarily, even approximately, in "steady-states", means that the concepts of optimum or maximum sustainable yields must be applied with caution. This calls for more intensive and more varied research than has usually been required in the past.

49. At the same time it must be recognized that many management actions will continue to be taken in respect of fisheries directed principally at a particular preferred species. Management of these fisheries will be largely based on single species models. The Committee noted that on the whole the single species assessment model approach has proved capable of providing useful advice on the utilization and maintenance of the resources on a sustained basis. Where failures in achieving the management aims have been experienced, the cause can be mostly attributed to the lateness of the scientific advice and/or in the implementation of management measures based on it.

50. The current need is for modification and adaptation of the single species approach for assessment and management, rather than wholly discarding it. An example of such modification is the two-tier catch quota system recently adopted by the International Commission for the Northwest Atlantic Fisheries (ICNAF).

51. The Committee identified a number of actions that could improve the assessment and management of multi-species fisheries. These were:

(a) the development of detailed statistical data for the individual fishery operations, especially records of catches, including estimates of discards, and their composition and fishing effort by species for small space and time divisions of each fishing area - repeatedly stressed by ACMRR, and specified in FAO Working Party Reports and Manuals;

(b) more detailed scientific studies of ecosystem dynamics, and the interaction between exploited species within each ecosystem;

(c) a close examination of the suitability of existing assessment models, and where necessary the development of new ones to meet the requirements for scientific advice in the changing situations; and

(d) the development of specialized fishing gear and fishing methods in single species fisheries to reduce the unintentional by-catch of unwanted species or to more effectively utilize the available surplus production of a species.

52. The Committee recommended that FAO take steps through its Regular Programme and through its regional bodies to promote these activities, and examine options for resolution of multi-species management problems. In this connection, it welcomed the activities already being initiated through various channels to improve the reliability, detail and timeliness of fishery statistics. These activities include the production of further manuals and guidelines, holding of expert meetings, and promoting the involvement of bodies from outside the specialized fishery field, e.g., the International Institute of Applied Systems Analysis (IIASA), which could contribute to the solution of these. It was hoped that these initiatives would be actively pursued.

5. WORKING PARTIES

(a) Joint ACMRR/CARPAS Working Party on Scientific Evaluation of the State of the Stocks in the Southwest Atlantic

53. The Committee noted that this Working Party had held its second session, and prepared a report which had been submitted to the Regional Fisheries Advisory Commission for the Southwest Atlantic (CARPAS). It believed that the work of resources assessment should be carried out directly by CARPAS, and that the Working Party should continue as a CARPAS Working Party without involving ACMRR. At the same time it was stressed on the one hand that non-member countries of CARPAS which have fisheries or research activities in the Southwest Atlantic should be urged to collaborate with CARPAS in these studies, particularly in the submission of statistical and biological data, and on the other hand, that CARPAS should arrange to facilitate the collaboration of the resource scientists of the relevant non-member countries.

(b) Working Party on Scientific Advice to Fisheries Management and Development Bodies

54. The Committee stressed the importance of the general field of work of this party. It noted the progress that had been achieved along the lines of its specific terms of reference, and congratulated the group on its report (FAO Fish.Rep.142, Suppl.1), and believed that this report deserved wide circulation. It had already been well distributed but should also be brought to the attention of other groups including the Committee of Fisheries Sub-committee on International Cooperation. The Committee believed that the specific items within the general field of interest of the working group which deserved special attention in the near future required modifications in the terms of reference, and probably also in the title and membership. It was therefore recommended that the present group should be terminated, and a new group established. (See Section 2, paragraph 34)

(c) Working Party on Aquaculture

55. A number of groups are now active in aquaculture, and in particular the UNDP-funded global project on aquaculture will provide a continuing activity, while the whole subject will be fully discussed by the World Aquaculture Conference, to be held in Japan in 1976. The Committee believed that this group will be held in suspension until after this Conference, and that its future should then be reviewed by the Committee.

(d) Working Party on Fishing Effort and the Monitoring of Fish Stock Abundance

56. The Committee noted the plans made for the work of this group. The progress had been slower than hoped, though this was due to other commitments of members of the group, especially in relation to various international regulatory commissions, but a number of background documents had been prepared. A meeting of this group is now scheduled for December 1975.

(e) Working Party on Marine Mammals

57. The Committee noted the extensive activities of this working party and its four ad hoc groups. It welcomed the progress achieved, and in particular the plan for the Marine Mammal Symposium, provisionally scheduled to be held in Bergen in September 1976. The members of the Committee warmly supported the proposal that Dr. R.M. Laws should be Chairman of this Symposium, especially in view of his direct experience of whale and seal research, and lack of involvement in current controversies.

(f) Working Party on Biological Effects of Pollutants

(g) Working Party on Biological Accumulators

(h) Working Party on Ecological Indices of Stress to Fisheries

58. The activities of all of these groups are being supported by the United Nations Environment Programme (UNEP). The last two groups have finished most of the substantive part of their work, and it was anticipated that all would complete their work shortly. It was recommended that when this was done they should all be disbanded.

(i) Ad hoc Group of Experts on the Facilitation of Acoustic Research in Fisheries

59. This group has continued its work by correspondence. The subject remained an important one that needed to be kept under review. The possibility of a meeting of the group was raised, and though this did not seem necessary at the present moment, this should be kept under review. In the meantime, the group should continue to work by correspondence.

(j) SCOR Working Group on Biological Data Inventories

60. The Committee noted that this, having completed its tasks, had been disbanded.

(k) SCOR Working Group 36 on Coastal Upwelling Processes

61. This group has had a number of meetings, which are expected to culminate at the Joint Oceanographic Assembly (JOA) in September 1976. It seems likely that at that time the group will be disbanded.

(l) SCOR Working Group 45 (Now known as Liaison Panel on Marine Research Related to Pollution)

62. The responsibilities of this group are now being duplicated by other groups concerned with pollution. The Committee supported SCOR's proposal that this group be disbanded.

(m) SCOR Working Group 46 on River Inputs to Ocean Systems

63. The Committee noted that this group had held one formal meeting and one informal meeting. Its work should continue.

(n) SCOR Working Group 50 on Biological Effects of Ocean Variability

64. The Committee noted the work already accomplished by the group, and especially the plans being made for the input to the JOA. The future of the group should be reviewed after the JOA.

65. There was some discussion on the relations between ACMRR and its working groups. It was agreed that the members of the Committee should be more fully informed of the activities of these groups, and that so far as possible, without involving undue delay in the preparation of the final reports, drafts of their reports should be distributed to the Committee members.

6. OTHER MATTERS

Relationships of ACMRR with IOC, SCOR and other bodies

66. The representative of IOC outlined some of the activities which were of interest to ACMRR, including GIPME and various cooperative investigations. Although IOC has not recently directed specific requests for advice from ACMRR, the Committee stood ready to respond to any such request. The officers and members of ACMRR were encouraged to find means of improving their advisory relationship with SCOR.

67. The question of SCOR/ACMRR joint activities was brought up. The Committee considered that an ACMRR nominee at meetings of SCOR/ACMRR working groups or similar joint groups should prepare a short report to the Chairman of ACMRR with copies to its members. The importance of ACMRR representation at the next SCOR Executive Meeting was stressed.

Joint Oceanographic Assembly (Edinburgh, September 1976)

68. It was noted that a number of the symposia to be held during the Assembly were likely to be of substantial value to fishery scientists as well as to the oceanographic community and that much of the programme was devoted to fishery-related topics; several members of ACMRR were serving as conveners and invited speakers. Funds available for the Assembly, particularly those required to ensure participation of conveners and invited speakers, were not yet sufficient despite the agreement several years ago of the intergovernmental bodies within ICSPRO to support the Assembly. At the Seventh Session of ACMRR, the Committee had asked that adequate funds to cover FAO's share be provided in the FAO budget. The Committee recommended that FAO make further efforts to provide adequate financial support, and further advises IOC and encourages Unesco, WMO and other interested UN organizations to provide the additional necessary funds.

World Appraisal of Fishery Resources

69. The Secretariat reported on the continuing work of resource appraisal, which forms the major element in the Regular Programme of the Fishery Resources and Environment Division, and which was also receiving some support from UNEP. The work was being concentrated through regional activities, and most of the revised regional studies had so far been published by the appropriate regional project. The Committee discussed the circulation of these reports, and noted that they (and other important material published by FAO) did not always reach all those who might be interested in them. The difficulties of maintaining comprehensive mailing lists in view of the range of subjects and interests covered by the Department of Fisheries was recognized. It was therefore recommended that FAO should look carefully at improved methods of distribution, and also methods of publicizing, e.g., through appropriate specialized journals, the lists of technical papers and reports available from FAO. At the next session a detailed report on the progress of resources appraisal should be submitted to the Committee.

Aquatic Sciences and Fisheries Information System (ASFIS)

70. The Committee took note of the draft report of the joint FAO/IOC Panel of Experts on ASFIS, as reviewed by the Secretary of IOC. It was felt that this report concerned a group of subjects of wide relevance, on which some satisfactory progress was being achieved. As a general point it was noted that the attendance at the meeting was composed of those directly concerned in one way or another with the supply of information services, and that it seemed desirable, as a matter of principle, that one or two users should also be present in the group.

71. On specific matters, it was noted that it was now five years since the publication of the last International Directory of Marine Scientists. There were a number of reasons for this delay, including the fact that the same basic register was being used for the Directory - in which the most important items were addresses, and a very broad classification by subjects - and for FAO as a means of identification of possible experts and consultants - for which quite a detailed classification is desirable. The Committee expressed dissatisfaction with the progress in this area and urged FAO/IOC/SCOR and other interested bodies to take immediate action to facilitate a new publication of the Directory.

72. The proposal for a register of research programmes was briefly discussed. It was felt that it was highly improbable that a comprehensive register that was at all meaningful and up-to-date could be maintained at any reasonable cost. Small registers of the more significant programmes within small and well-defined fields, similar to the contacts maintained by the ACMRR group on acoustic research, might be both practicable and useful, and the possible preparation of such registers could merit further attention.

73. The Committee noted that there were difficulties in including meeting documents of ICES and similar bodies in the ASFA system, but believed that these papers contained some of the most important information for fisheries. It therefore recommended that ICES and other bodies should be urged to allow these documents to be included in the information retrieval system, at least as far as is possible, while recognizing that these papers often contain interim material.

Working papers for ACMRR sessions

74. The Committee noted that the working papers presented for the session were deserving of a wider distribution. Unless they were expected to be published elsewhere, most of them should be included as a supplement to the Committee's report, or otherwise in an FAO series. The officers should determine which papers should be included, and ask the authors concerned whether they were considering publication elsewhere, or would be willing to have them published by FAO.

Intersessional activities

75. The members of the Committee believed that both individually and as a group, they should be more actively engaged during the intersessional period. One recommended action was for each member of the Committee to prepare and circulate directly to each of the other members at least once during the period a short one or two page report on a particular activity. These might cover a particular area, e.g., North Pacific, or a particular topic, e.g., ecosystem management. A list of subjects for each member was proposed by the Chairman, but it was emphasized that this was only a suggestion, and each member should be encouraged to act in respect of any topic on which he had information of interest to the Committee. The Secretariat was also urged to ensure the distribution to the Committee of significant documents relative to its work.

Date and place of next session

76. It was agreed that the Ninth Session should be held in FAO Headquarters, Rome, early in 1977.

Election of Officers

77. The Committee unanimously elected Dr. D.L. Alverson as Chairman, Dr. K. Tiews as first Vice-Chairman (and Rapporteur) and Dr. A. Mena as second Vice-Chairman. The new Chairman thanked the Committee for its confidence in him, and congratulated the outgoing Chairman, Mr. G. Saetersdal, on the excellent way he had guided the Committee during his term of office.

APPENDIX 1

LIST OF PARTICIPANTS

Members of ACMRR

Dr. D.L. Alverson (Vice-Chairman and Rapporteur)	Director Northwest Fisheries Center National Marine Fisheries Service 2725 Montlake Boulevard East Seattle, Washington 98112 U.S.A.
Dr. A.S. Bogdanov*	Director VNIRO 17 V. Krasnoselskaya Moscow B-140 U.S.S.R.
Dr. L.M. Dickie	Institute of Oceanography Dalhousie University Halifax, N.S. Canada
Dr. A.R. Longhurst	Institute of Marine Environmental Research 13/14 St. James Terrace Citadel Road Plymouth, Devon PL1 3AX U.K.
Dr. A.W. May	Director-General Fisheries and Marine Service Environment Canada 580 Booth Street Ottawa, Ontario Canada K1A 0H3
Dr. A. Mena Millar	Director Director Centro de Investigaciones Pesqueras (CIP) Calle 26 Miramar, La Habana Cuba
Mr. N. Odero	Director of Fisheries Ministry of Tourism and Wildlife P.O. Box 40241 Nairobi Kenya
Mr. B.B. Parrish	Director, Marine Laboratory Department of Agriculture and Fisheries of Scotland P.O. Box 101 Aberdeen AB9 8DB Scotland, U.K.

* Unable to attend

Members of ACMRR (cont.)

Dr. M. Ruivo	Department of State for Fisheries Praça Duque da Terceira - 24/3/Esq. Lisbon Portugal
Mr. G. Saetersdal (Chairman)	Director Fiskeridirektoratets Havforskningsinstitutt Nordnesparken 2 Bergen Norway
Dr. A. Suda	Counsellor Department of Research and Development Fishery Agency Kasumigaseki Chiyoda-ku Tokyo
Dr. V. Susanto	Director Resources Protection and Conservation Directorate-General of Fisheries Department of Agriculture Jalan Salemba Raya 16 Jakarta Indonesia
Prof. K. Tiews	Director Institut für Küsten und Binnenfischerei Bundesforschungsanstalt für Fischerei Palmaille 9 2000 Hamburg 50 Federal Republic of Germany
Prof. W.S. Wooster	Rosenstiel School of Marine and Atmospheric Science University of Miami 10 Rickenbacker Causeway Miami, Florida 33149 U.S.A.

Representatives and Observers of International Organizations

IOC and Unesco

Mr. D.P.D. Scott	Secretary, IOC c/o Unesco Place de Fontenoy 75700 Paris France

SCOR (ICSU)

Prof. W.S. Wooster	- see above -

Food and Agriculture Organization

Dr. J.A. Gulland	Chief, Aquatic Resources Survey and Evaluation Service Fishery Resources and Environment Division
Dr. S.J. Holt	Fisheries and Environment Adviser In Charge, Marine Mammal Projects Fishery Resources and Environment Division
Dr. H. Kasahara	Director, Fishery Resources and Environment Division Department of Fisheries
Mr. F.E. Popper	Assistant Director General (Fisheries)
Dr. J.P. Troadec	Senior Fishery Resources Officer Aquatic Resources Survey and Evaluation Service Fishery Resources and Environment Division

Secretariat of the Committee

Secretary	Dr. H. Kasahara
Secretarial assistants:	Mrs. R.M. Capparucci Miss D. Dearing Mrs. J. Landone

APPENDIX 2

AGENDA

1. Procedural Matters

   1.1 Opening of Session
   1.2 Adoption of Agenda
   1.3 Date and place of Ninth Session
   1.4 Election of Chairman and Vice-Chairmen for the forthcoming period of activity

2. Evaluation of the Impact of Expected Changes in the Regime of the Sea on Research and Management Aspects of Fisheries

   2.1 Assessment of the present state of fishery science, particularly in developing regions
   2.2 Assessment of the short-term and long-term needs and measures to respond to them
   2.3 Policy implications for the conduct of fishery and related research

3. Multiple Use of Ocean Space and Resources and its Impact on Fisheries

4. Some Actual Problems in the Management of Advanced Fisheries

   4.1 Problems in multi-species fishery management
   4.2 Fishing technology and strategy in fishery management

5. Progress Reports from Working Parties

6. Other Matters (World Appraisal of Fishery Resources, ACMRR-IOC relationships, ASFIS consultations, etc.)

7. Closing of Session

APPENDIX 3

LIST OF DOCUMENTS

ACMRR:8/75/WP.1	Provisional Agenda
ACMRR:8/75/WP.2	Annotated Agenda
ACMRR:8/75/WP.3	Draft Timetable
ACMRR:8/75/WP.4 3/	The effect of increasing multiple use of ocean space and resources on world fishery productivity and extraction, by R.P. McGreevy
ACMRR:8/75/WP.5 1/	Institute-building projects, by G.L. Kesteven and B.B. Parrish
ACMRR:8/75/WP.6 1/	Problems and priorities in providing research input to fishery management and development, by J.A. Gulland
ACMRR:8/75/WP.7 1/	A linear programming approach to multiple species management for the Bering Sea, by Loh Lee Low
ACMRR:8/75/WP.8 1/	Effect of multi-species fisheries on the management of halibut stocks, by S.H. Hoag and B.E. Skud
ACMRR:8/75/WP.9 2/	Selective harvesting gear and methods. Some developments useful for the reduction of conflicts, including those between fisheries directed at different species, by I.E. Ellis and R. French
ACMRR:8/75/WP.10 1/	The effects of changing jurisdictional and management concepts on the ocean's living resources and environment. The potential impact on fisheries science, by D.L. Alverson
ACMRR:8/75/WP.11 1/	Some aspects of fishing patterns in relation to fishery management, by Ø. Ulltang
ACMRR:8/75/WP.12 2/	Management of coastal fishery resources under the new regime, by H.A. Larkins
ACMRR:8/75/WP.13 1/	A note on the state of fishery research in the North-east Atlantic, by G. Saetersdal
ACMRR:8/75/WP.14 1/	Effects of UNCLOS on research and management aspects of fisheries. Assessment of long-term and short-term needs, and of measures to respond to them. Discussion notes, by S.J. Holt
ACMRR:8/75/WP.15 2/	The total biomass approach to fisheries management, by R.L. Edwards
ACMRR:8/75/WP.16 1/	Present scientific capacities in developing regions, by J.P. Troadec
ACMRR:8/75/WP.17 1/	Problems in multi-species fisheries, by J.A. Gulland
ACMRR:8/75/WP.18 1/	Aid in research projects, by G.L. Kesteven
ACMRR:8/75/WP.19	- Not issued -
ACMRR:8/75/WP.20 1/	Review of the present state of activities of the ACMRR Working Parties and joint SCOR/ACMRR Working Groups, by E.F. Akyüz

1/ Included in the Supplement to this Report
2/ Issued elsewhere
3/ Summary only included in the Supplement to this Report. Complete document will be issued elsewhere.

APPENDIX 4

LIST OF ACRONYMS USED IN REPORT

ACMRR	Advisory Committee on Marine Resources Research
ASFA	Aquatic Sciences and Fisheries Abstracts
ASFIS	Aquatic Sciences and Fisheries Information System
CARPAS	Regional Fisheries Advisory Commission for the Southwest Atlantic
COFI	Committee on Fisheries
GIPME	Global Investigation of Pollution in the Marine Environment
ICES	International Council for the Exploration of the Sea
ICNAF	International Commission for the Northwest Atlantic Fisheries
ICSPRO	Inter-Secretariat Committee on Scientific Programmes Relating to Oceanography (FAO/Unesco/WMO/IMCO/UN)
ICSU	International Council of Scientific Unions
IIASA	International Institute of Applied Systems Analysis
IOC	Intergovernmental Oceanographic Commission
JOA	Joint Oceanographic Assembly
SCOR	Scientific Committee on Oceanic Research
UNCLOS	United Nations Conference on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
Unesco	United Nations Educational, Scientific and Cultural Organization
WMO	World Meteorological Organization

MR/H3520/E/12.75/1/1025